CLAIMS

What is claimed is:

1. A bridge rectifier for an alternating current generator having a slip-ring-end, comprising:

a first heat sink having a first polarity set of diodes;

an insulating layer located on said first heat sink;

a second heat sink having a second polarity set of diodes and disposed on said insulating layer;

a connection cover mounted on said second heat sink;

a capacitor connected to said connection cover and to said second heat sink; and

a B+ stud mounted on said second heat sink and going through the alternator slip-ring-end, said first heat sink and the insulating layer.

2. The bridge rectifier according to claim 1 wherein the second heat sink comprises:

a base section including first and second areas;

dome shaped holes into the second heat sink and receiving said first polarity set of diodes therein;

diode receiving holes in said base section and receiving said second polarity set of diodes therein; and

a plateau section disposed on the first area of said base section.

3. The bridge rectifier according to claim 2 wherein the connection cover is mounted on said base section and covers the second area of said base section.

4. The bridge rectifier according to claim 1 wherein said B+ stud includes a knurled area comprising knurled teeth, and wherein the stud is inserted into a corresponding hole in the second heat sink with the knurled teeth penetrating the walls of said hole.

5. A bridge rectifier according to claim 1, wherein said first heat sink comprises a substantially symmetrical diode layout.

6. A bridge rectifier according to claim 1 wherein a negative diode is adjacent to a corresponding hole for the B+ stud.

7. A bridge rectifier according to claim 2, wherein said second heat sink has a heightened plateau section.

8. A bridge rectifier according to claim 1, wherein said second heat sink has a substantially symmetrical diode layout.

9. A bridge rectifier according to claim 2, wherein said second heat sink further comprises radial air grooves disposed on a top surface of the base section.

10. A bridge rectifier according to claim 2, wherein said second heat sink further comprises dome shaped holes to accommodate said first polarity set of diodes into the base section of the second heat sink.

11. A bridge rectifier according to claim 1, wherein said connection cover has filleted bottom inner and outer edges.

12. A bridge rectifier according to claim 1, wherein said connection cover has a heightened radial rim over the outer edge of the top face of said connection cover to block airflow over said top face.

13. A bridge rectifier according to claim 1, wherein the diodes of said first polarity set of diodes mounted on said first heat sink are of different dimensions than the diodes of said second polarity set of diodes.

14. A bridge rectifier according to claim 1, wherein said diodes comprise diode casings, and wherein all electrical contacts which are external to the diode casings are exclusively mechanically press-fit.

15. A bridge rectifier according to claim 1, wherein said diodes comprise diode casings, and wherein all electrical contacts which are external to the diode casings are exclusively ultrasonically joined technologies.

16. A heat sink for a bridge rectifier comprising:

a plurality of diodes arranged in a substantially symmetrical diode layout; and

wherein at least one diode is a negative diode adjacent to a corresponding hole for a B+ stud.

17. A heat sink for a bridge rectifier according to claim 16 further comprising a heightened plateau section area.

18. A heat sink for a bridge rectifier according to claim 16 further comprising radial air grooves disposed on the top surface of a base section of said heat sink to maximize convection surface area and allow for radial airflow on said surface.

19. A heat sink for a bridge rectifier according to claim 18 further comprising dome-shaped holes to accommodate a first polarity set of diodes into a base section of said heat sink, without impeding on the grooved convection area.

20. A connection cover for a bridge rectifier comprising:

a top face;

filleted bottom inner and outer edges to facilitate and create airflow over a top surface of a base section of a heat sink; and

a heightened radial rim over the outer edge of the top face of said connection cover, to block airflow over said top face, thus facilitating cooling airflow between the connection cover and the top face of the base section of said second heat sink.

21. A B+ stud for a bridge rectifier comprising:

a knurled area comprising knurled teeth adapted for insertion into a corresponding hole in a heat sink;

wherein said knurled teeth penetrate the walls of said hole.

22. A method to increase the current generating capabilities of a current generating source having a slip-ring-end seating area, comprising the steps of:

maximizing conduction area of a first heat sink in contact with the slip-ring-end seating area;

decreasing the thickness of the first heat sink;

optimizing diode layout on the first heat sink for balanced thermal load on the bridge rectifier;

maximizing the conduction area of a second heat sink in contact through an insulating layer of the first heat sink to the first heat sink;

heightening a base section of the second heat sink to enhance thermal and electrical conduction through said heat sink;

heightening a plateau section area of the second heat sink to enhance forced convection performance of said second heat sink;

optimizing the diode layout on the second heat sink for balanced thermal load and heat distribution over said second heat sink;

adding radial air grooves on the second heat sink, disposed on the base section top surface to maximize convection surface area and allow for radial airflow on said surface;

adding dome-shaped holes on the second heat sink to accommodate a first polarity set of diodes into the base section of the second heat sink;

adding filleted bottom inner and outer edges on a connection cover to facilitate and create airflow over the top surface of the base section of the second heat sink;

adding a heightened radial rim over the outer edge of the top face of the connection cover to block airflow over said top face; and

providing a B+ stud that includes a knurled area comprising knurled teeth, wherein the stud is inserted into a corresponding hole on the second heat sink with the knurled teeth penetrating the hole-walls in the second heat sink body;

wherein the first polarity set of diodes, mounted on said first heat sink, are designed for maximum direct bottom thermal conduction to the alternator slip-ring-end, while still retaining intact lateral conduction properties; and

wherein a second polarity set of diodes, mounted on said second heat sink, are designed for maximum lateral thermal conduction to said second heat sink, while still retaining intact bottom conduction properties.

23. A method according to claim 22, further comprising contacting all electrical contacts which are external to the diodes exclusively through a mechanical press-fit.

24. A method according to claim 22, further comprising contacting all electrical contacts which are external to the diodes exclusively through ultrasonic technologies.